Sub-Seasonal Forecast Rodeo: Beat NOAA

When: Planned launch December 2016

Problem Statement: Water managers need more skillful information on weather and climate conditions with lead-times ranging from 15 days to 45 days and beyond. Lacking skillful information limits water managers' ability to predict streamflow and water supply for sub-seasonal forecast lead-times. Lack of sub-seasonal weather and climate information, in turn, limits our ability to prepare for shifts in hydrologic regimes, such as the onset of drought or occurrence of wet weather extremes.

There is no exact definition of the time period encompassed by sub-seasonal. Broadly speaking sub-seasonal bridges the weather and climate continuum in the period extending from roughly 15-60 days. For weather times scales (2 weeks or less), the initial states of the atmospheric component of the earth system (temperature, moisture, winds) are critical to the forecast. At time scales longer than several months, the forecast is controlled more by the earth system components that change over long time scales (e.g., ocean conditions). The challenge of sub-seasonal forecasting is that it encompasses the time frame where initial state information (e.g., coupled land-atmosphere processes) becomes less important and slowly varying long term states (e.g., sea surface temperatures, soil moisture, snow pack) become more important to prediction skill. However, the relative importance of the initial state vs longer term state to forecast skill depends on the lead time and region of interest.

In response, Reclamation is launching a forecasting prize competition where solvers will submit forecasts of temperature and precipitation for one year, competing in real-time against other teams as well as official forecasts from NOAA. Recognizing NOAA's leadership and role in forecasting, Reclamation has partnered with NOAA on this competition. To be eligible for prizes, solvers with skillful performance during the competition will be required to submit documentation of their forecast technique.

Brief description of the potential impact from a successful solution to this problem: Techniques that outperform current forecast practices are expected to offer valuable insight as to how operational forecasts can be improved at the sub-seasonal timescale. This in turn will offer a variety of sectors – not just water management – much needed information to better manage resources and prepare for extreme events. A few examples include advanced emergency preparedness, enhanced water order scheduling, and wildfire management.

Prize Competition Scope: This is a Reduction to Practice Challenge that will be launched in December of 2016. The completion period will begin March 2017 and conclude 1 year thereafter. Including judging, awarding of prizes, and identification of next steps, the expected completion is May 2018. It is possible that another competition may be a recommended next step, perhaps focusing on extremes or a longer outlook. A variety of prizes may be awarded as part of this competition, the total of which exceeds $500,000. Categories include performance overall, regionally, and for extremes, as well as an exceptional performance bonus. Within each category prizes may be awarded for skill at two outlook timescales and for temperature as well as precipitation.

In addition to partnering with NOAA on this competition, Reclamation has participation from a variety of state and federal agencies on the competition design, review, and next steps phases.

Learn more about the Water Prize Competition Center at: www.usbr.gov/research/challenges